

An Observing System for Land Process Characterization featuring NPOESS

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Science must play an integral role in understanding, modeling, and predicting the effects of human activities on the environment for various reasons, such as the development of effective strategies for adapting, mitigating and responding to environmental change. Environmental change, for example, generally demands observing relevant processes that act over different spatial and temporal scales. Such requires overcoming many challenges, which include linking and integrating data and information from disciplines that have been traditionally separated. This initially requires an infrastructure that utilizes data layers from various sources, beginning at the satellite-level and extending to the earth's surface, is adaptive enough to accept data from multiple disciplines, will analyze and make these data and the information derived from them, available in a real-time, interactive format. We arbitrarily call this infrastructure an observing system.

There is a need for an observing system that will provide accurate, near-real-time information regarding land use/land cover characteristics and changes occurring across Earth's landscapes at intermediate (e.g. pixel sizes of about 20-80 m) to coarse (e.g. pixel sizes greater than 1000 m) spatial scales. Land cover types have patch sizes that are substantially smaller than the coarse scale data can reveal. Intermediate scale is appropriate for monitoring tropical deforestation and urbanization, but intermediate scale sensor platforms have poor revisit frequencies. In contrast, coarse spatial scale is appropriate for monitoring altered plant growth cycles that might occur in response to global warming and/or climate change, and have good revisit frequencies. The Visible/Infrared Imagery/Radiometer Suite (VIIRS) that will be on-board the National Polar-orbiting Environmental Satellite System (NPOESS) and its predecessor, the NPOESS Preparatory Project (NPP; launch 2006), is a natural step from coarse to intermediate observing systems used to monitor land process characteristics and change. The presentation highlights the design of an observing system for monitoring Land Process Characteristics featuring NPOESS as the primary satellite sensor.